Accelerator Systems Division Highlights Ending August 19, 2005

Installation

Craft Snapshot 8/2/05

ASD productive craft workers	45.0
Foremen (Pd by 15% OH)	5.0
HSM management (Pd directly)	3.0
TOTAL AMSI WORKERS	53.0
Less WBS 1.9, 1.2 etc	7.0
Less absent	4.0
TOTAL PD BY ASD/ORNL DB WPs	34.0

Accelerator Physics

Operations:

- Ran beam for commissioning studies
- Completed Beam Fault studies, evaluating data
- Developing a running plan for post CD-4 and FY 07-08
- Met with XFD to get their requirements and buy in. Draft schedule for the period through 07 will go out this week.
- Working to develop a power monitoring program for next Thursday
- Obtained approval for Increasing pulse length to 200 us at 20 mA peak

!!! OVER THE WEEKEND ASD ACHIEVED 2 x 10E+13 at 865 MeV!!!

Ion Source

- Emittance scans on the hot spare stand have shown that the neutral beam can be detected by switching off the suppressor. Although the acceptance is limited to 2 mrad, the scan shows the spatial distribution of the neutral beam in relation to the H- beam. This has the potential to be used as an alignment diagnostics.
- After 38 days of operation, the source on the Front-End was cesiated for a second time, boosting the beam current up to 30 mA.

Survey and Alignment

RING:

- Swept Ring to remove all Survey & Alignment equipment, in anticipation of Ring closure.
- Met with engineers to get details on alignment jig for injection dump remote handling unit. Leveled rails and plumbed flange on jig.

RTBT:

- 21Q40 Final alignment: QH12, QH16, QH17.
- [Settlement monitoring to be performed today.]

TARGET:

- Set out elevations for BL4 roof.
- BL2 chopper NCS012-1 fiducialized.
- BL2 chopper NCS012-2 fiducialized.
- BL2 chopper NCS012-3 fiducialized.
- Set prototype mirror on BL 2.
- Optically measured the target thermocouples from the hot cell.
- Marked points and lines on BL 13 for poured-in-place. (Twice, due to an incorrect drawing being provided to S&A).
- Begin rail alignment on rad-hard stand in the north target hall (work stopped due to lack of hardware).
- Performed an additional direction set to strengthen as-built mapping of beamline 2 guide fiducials.
- Completed least squares adjustment of beamline 2 guide fiducials.

Magnet Measurement:

- 30Q44_07 fiducialized.
- Corrector 41CDM30#5 optically aligned and fiducialized.
- 30Q58_8 optically set.

Miscellaneous:

- S&A shop cleaned. Equipment cage re-organized and de-cluttered. Miscellaneous survey equipment retrieved from various sites and relocated to S&A shop. S&A fire cabinet relocated from HEBT service to S&A shop. Shop RSS updated.
- Alignment, IFM, ADM, and reflector check calibrations performed

Mechanical

Magnets

- The last RTBT 21Q assembly went to the RTBT this week.
- We finished measurement of the 41CDM30 which will go in the Injection Dump.
- The last 30Q is on the measurement stand.
- We are assembling one 30Q44 for installation into the RTBT. Another 30Q44 is ready for installation.

Water Systems Installation

- A Ring quad magnet cooling leak was discovered during magnet testing and repaired.
- Installation of the Ring Collimator cooling system pneumatic lines was completed.
- Installation of the RTBT Collimator cooling system pneumatic lines was started.
- Installation of the RTBT vacuum sector valve pneumatic control lines was started.
- Fabrication of the RTBT/Target Quad cooling manifold continued.
- Preventative Maintenance on the Linac water systems continued

Ring Systems Installation

- The HEBT Linac Dump beamline Wire Scanner was installed.
- The Ring / RTBT beamline vacuum seal procurement was released.
- The RTBT beamline drift pipes # DP5, DP6, DP7, DP8, DP9 and DP10 were installed.
- The RTBT beamline diagnostic #BCM11 was installed.
- The RTBT/Target Duratek small shielding blocks were relocated to the storage area at the west end.
- The RTBT/Target quad magnets' pits' shielding bottom plates were relocated to the storage area at the west end.
- The RTBT/Target quad magnets' assembly/test stand rails were aligned
- The RTBT/Target flight tube was placed under vacuum.
- The RTBT 21Q40 magnet assembly QV13 was delivered to the tunnel

Electrical

- The integrated tests of the 8 Ring Injection Kicker power supply/magnet tests are complete including the heat runs. This includes successful integration with the EPICS control systems and operation of all 8 power supplies/magnets at full power simultaneously. This completes the testing of 8 of 54 Ring Service Building Magnet Power Supplies.
- The Main Ring Dipole Power Supply has been operated successfully above the 1.3 GeV current level (at 5600 A and 310 V). We will begin the calibration/EPICS interface and heat runs this weekend.
- The 6 Ring Quadrupole Magnet Power Supplies have all been operated above their 1.3 GeV current levels (1000 A for the arc quads, 1300A for the straight section quads). Some work on the compensation networks is still required.
- Installation work continues in the Ring service Building terminating BPM cables, installing AC power to racks and power supplies, and wiring of the extraction kicker system

HPRF

Ring RF

- Station 21 has been configured as a 1st harmonic cavity and it will be this station we operate first.
- We do not have Ring Tunnel access but have previously made-up the tunnel interlocks for Station 21. We are using this time to work our way through the interlock chain for Station 21.
- We have had Control Power on all racks for Station 21.
- We have power on all RF Control Room racks.
- We can communicate with the HPRF IOC through the network and had a preliminary look at the Low Level hardware components.
- We have done a cursory look at the interlock chain for Station 21.
- We have identified and corrected some Station 21 interlock wiring omissions. All the stations have the same omissions and we will fix them as we progress through the entire system.

LLRF

Cryo Systems

Controls

- Work this week was divided between supporting operations for the SCL run and continued installation and testing for the HEBT and Ring. The control system is running well and has contributed to this week's achievement of 865 MeV at the linac dump. The biggest issue has been continued difficulties associated with monitoring the SCL insulating vacuum. A problem with the analogue technique (Beckhoff) for measuring this vacuum has been identified and a solution devised and tested in the lab. This will be implemented during next week's maintenance day. A bad VME crate (bent connectors) was the cause of intermittent bad data from the serial system for insulating vacuum measurements. The crate was replaced and the errors appear to have disappeared. To reduce the possibility of scan rates being set beyond the capability of the vacuum IOCs, all insulation vacuum Cold Cathode Gauges (CCGs) were set permanently to be scanned at 10 second intervals; all other CCGs at 2 minutes and all Ion Pumps at 720 seconds. Analog pressure readings were added to the archiver and new operator screens were added for the vacuum valve logic. There are still serious performance and design issues with the serial readout system and an improvement strategy will be developed next week.
- The operations program requires many reconfigurations of the MPS and BLM systems – some shortcuts have been developed and installed.
- It was discovered that beam loading would be a problem for operation with pulse lengths greater than 40usecs. A new beam load compensation method based upon a differentiated error signal was developed using MatLab, has been installed in the DTL LLRF system and is ready for testing on the DTL as soon as beam is restored.
- A new Physics server was provided to the Physics group to address performance and CPU load problems. At the same time a simple round-robin load-balancing algorithm was developed and tested to balance the Physics Applications load between three servers. This will be implemented during next week's maintenance day.
- A tool was developed to allow simple and intuitive ad hoc archive request files for temporary experiments. This tool will be made available as soon as some user-friendlification is completed. (Look that up in your Funk and Wagnall's.)
- The Controls Team continued to support the Diagnostics ("NAD") Timing Card study with signal integrity and FPGA design consulting. Experiments were conducted on the single-ended signals in the timing card Event Link and RTDL circuits and boards were modified as required for field installation.
- Work continued on the design and production of the LEBT Chopper controller electronics. The existing prototype chopper controller is being converted to fiber optic inputs and prepared for installation, while the prototype 2 controller FPGA and hardware design is in progress.
- The main Ring dipole was functionally tested with the Ring PPS access control system and can now be enabled for testing. Field work is continuing at a good pace and nearing completion for PPS equipment in the RTBT and Injection dump. Design, installation and programming for the Target PPS also continued this week.
- Preparations continued for testing of the proposed long ion chamber (LION) in the tunnel, including completion of the device driver for the Keithley Electrometer. The 1 5/8" heliax and connectors were received from the Vendor. The gas fittings and gas purge system has been connected and dry N2 is flowing. Initial leakage current is 5.5 nA at 100 volts bias.
- DCS delivered all the ring and RTBT vacuum equipment except for one of two remaining RTBT racks. This rack is held up awaiting parts from SNS. DCS has also checked the cabling out thoroughly, ringing out each conductor. A proposal from Sverdrup for Ring O2 analyzers and pressure transducers was received and approved.
- Preparations were made for a power usage test in support of the SNS Power Upgrade Program (PUP) to be executed next maintenance day. All required signals are available in EPICA and are being archived.
- A command-line interpreter with a learning filter was developed to more efficiently monitor the electronic logbook.
- Communications installation in the Ring Service Building continues to progress. Timing links are now operational in the Ring RF Control Room.
- ICS network services are now available in much of the Target Building and are supporting start-up of Target control systems.
- The PPS Team said good-bye to Nick Pate whose term finished this week. We wish him well.
- After correctly configuration of the IO bus (FlexIO), the Ring HPRF IOC and PLC are online, and the operator screens display correct data from the equipment/device.
- The Controls Group provided six rowers to the ASD "SNS Accelerators" Dragon Boat team, which competed for the SNS Dragon Boat Cup on Saturday. The result: "Wait 'til next year."

Beam Diagnostics

BPMs
BCMs
BLMs
Foil video